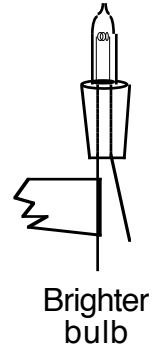
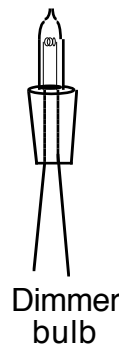
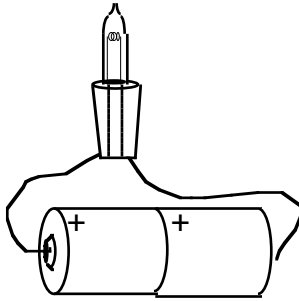


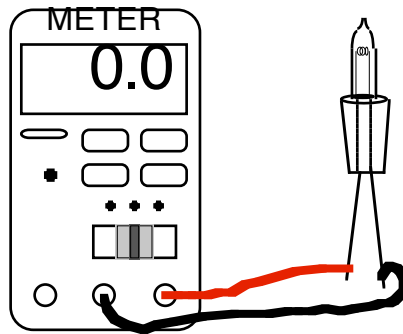
Parallel & Series Circuit Notes/Activities

Answer questions in complete sentences, when possible.

Sort your light bulbs according to brightness. To do this connect the ends of each bulb to a pair of batteries. Attach a piece of tape to one of the wires on each BRIGHT bulb.



Take the brighter and dimmer light bulbs to the "Ohm Meter" in the room. Attach the leads of the meter to the ends of the wire on the light bulb.



It does not matter which wire is attached to which probe wire from the meter.

The number on the meter is the resistance of the bulb in Ohms, Ω .

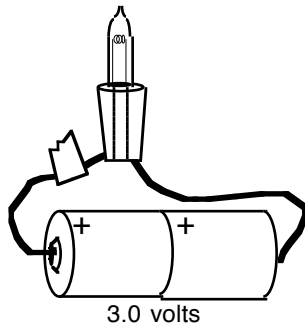
1 Resistance of the "dimmer" bulbs: _____ (2) Resistance of the "brighter" bulbs: _____

3 Each bulb has the same voltage across it when you tested it. Use ohms law to try to explain why the brighter bulb is brighter.

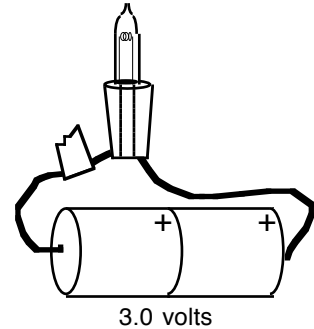
Parallel & Series Circuit Notes/Activities

Answer questions in complete sentences, when possible.

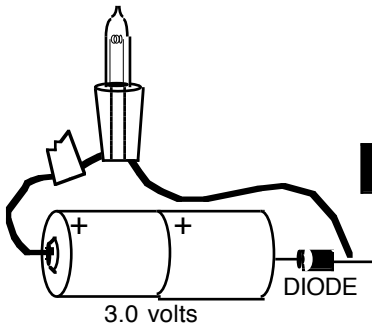
Take a bright light bulb and connect to two batteries as shown below.



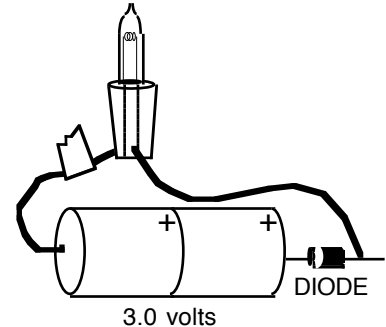
Next, flip the batteries around and connect them to the light bulb as shown.



Attach a "Zenor" diode to one of the ends of the light bulb. The zenor diode is a small black cylinder on a wire. It has a thin silver band around the circumference at one end. It does not matter which end the diode is attached to or which side of the diode faces the light bulb. Repeat the steps above.



Next, flip the batteries around and connect them to the light bulb as shown.



- 4 What function does the diode perform to the current flow?

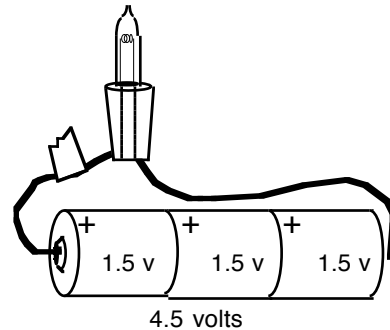
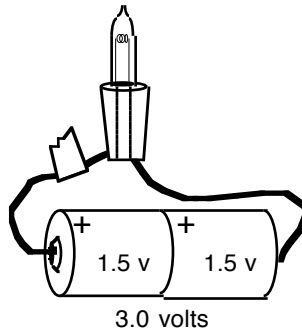
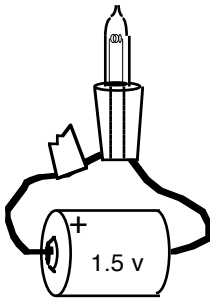
- 5 How is a zenor diode is used in battery powered device like a discman™ or TV remote?

Parallel & Series Circuit Notes/Activities

pg 3

Answer questions in complete sentences, when possible.

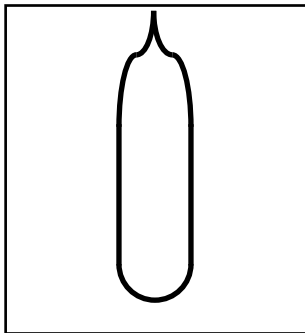
Take the brighter light bulbs and keep adding batteries until the bulb burns out. Combine your resources with another group. Burn out ONLY one light bulb. Put an "X" on the burnt out bulb's tape.



6 Describe what you see happening to the light bulb as more and more batteries are added.

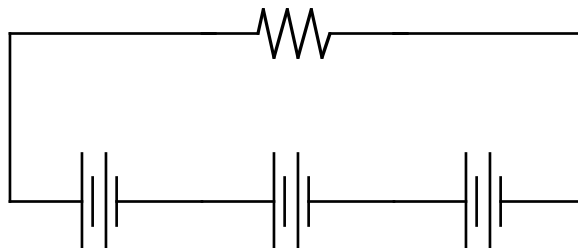
7 How many volts did it take to burn out the light bulb?

Elsewhere in the classroom is a burnt out light bulb, it is under a 30X magnifying loop. Take a look at and draw what you see inside the bulb.



8 Base on what you see under the magnifying loop. Why do you think the light bulb stops working?

The schematic diagram for the circuit above with 3 batteries looks like this...



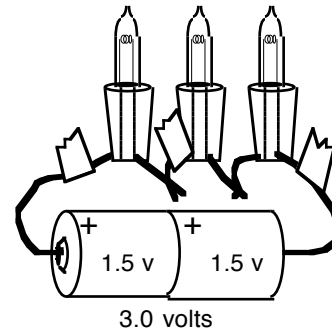
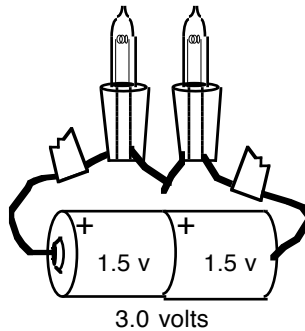
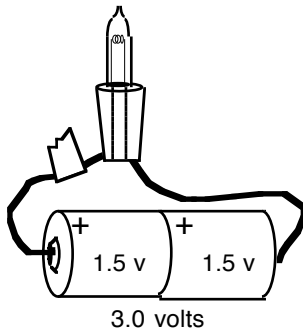
9 A light bulb is really a resistor that glows. Draw a box around the schematic symbol that stands for the light bulb in your circuit.

Parallel & Series Circuit Notes/Activities

Answer questions in complete sentences, when possible.

All circuits must make a loop like the diagram on the previous page. A loop means the one wire must connect to a positive end of a battery while the other end connects to a negative end. You must have a difference in voltage.

Make each circuit below with the bright light bulbs. (The actual length of the wire in between the bulbs will not affect your results to any noticeable measure.)



10. The batteries are connected in series and light bulbs are all connected in series. Draw a circuit for each diagram above in the space below.

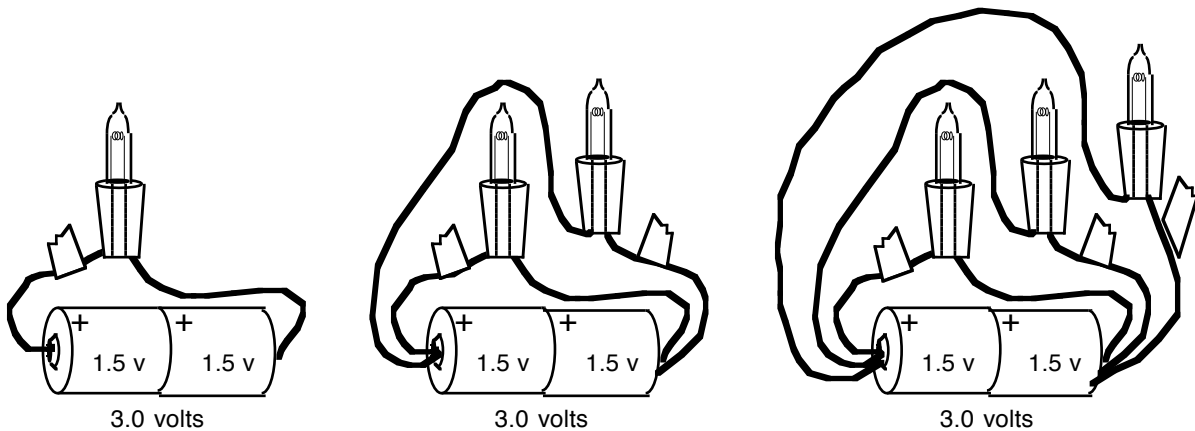
11. What did you notice happening to the brightness of each light bulb as you added more and more light bulbs in series?

12. **The brightness in each light bulb is directly proportional to the voltage delivered to the light bulb - because each bulb has the same resistance.** Explain why each light bulbs' brightness is affected the way it is was when they were added in SERIES in terms of what we have recently studied in electricity.

Parallel & Series Circuit Notes/Activities

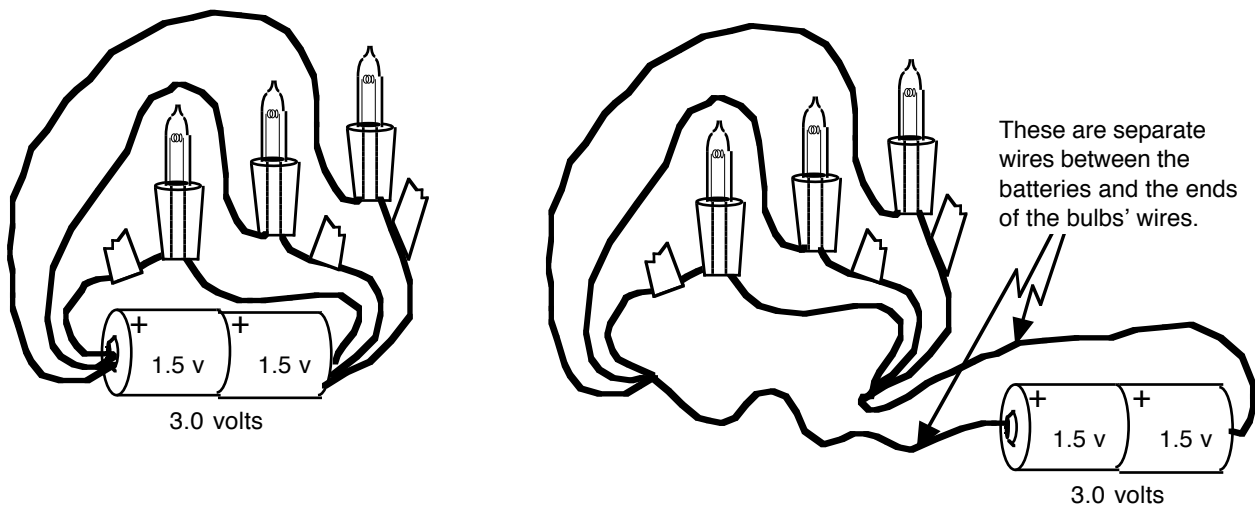
Answer questions in complete sentences, when possible.

Make the following circuits.



- 13 Describe what you see happening to the light bulb as more light bulbs are added.

Make the circuits below.



14. What is the effect on the bulbs' brightness when the extra 2 pieces of wire are added?

- [illegible]

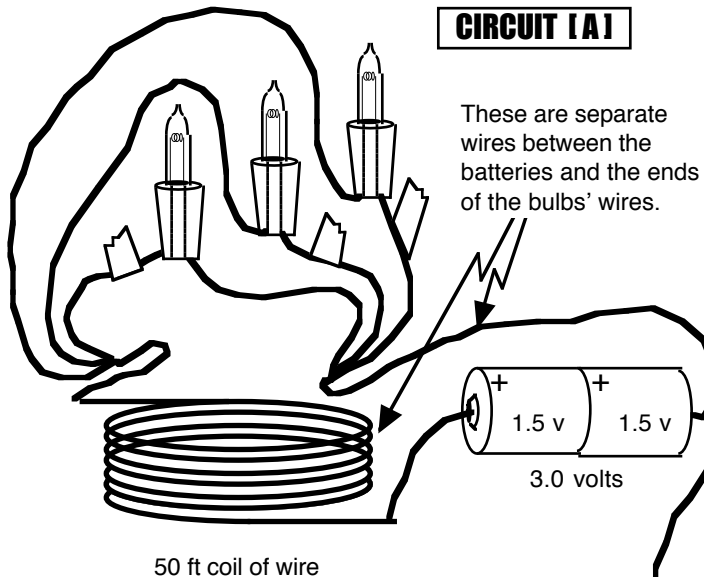
-
- A diagram of a series circuit. It consists of two 1.5V batteries connected in series, providing a total voltage of 3.0 volts. Three light bulbs are connected in series with the batteries. The circuit is shown as a single loop with a switch that is currently open.

Parallel & Series Circuit Notes/Activities

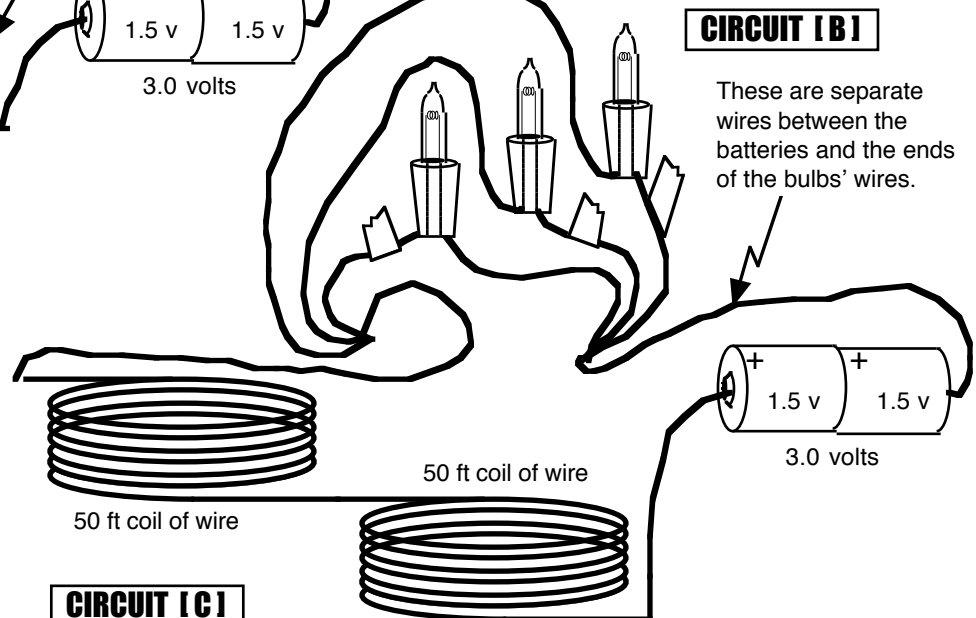
Answer questions in complete sentences, when possible.

Make the two circuits shown below. **Rank the brightness of each circuit from 1 to 3. by writing a number next to the circuit. The brightest circuit is a "1."**

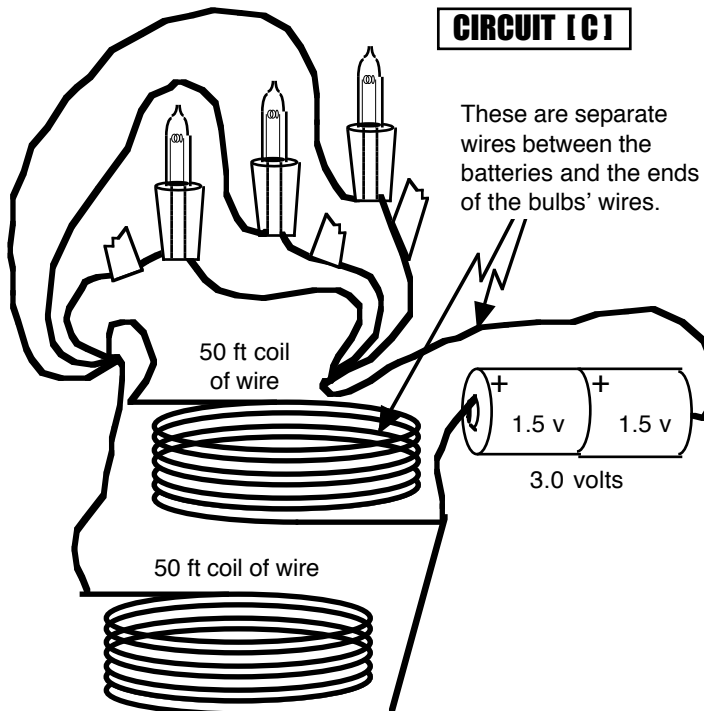
CIRCUIT [A]



CIRCUIT [B]



CIRCUIT [C]



Parallel & Series Circuit Notes/Activities

Answer questions in complete sentences, when possible.

- 17** What is the effect of making the length of wire between the batteries and the light bulbs longer?

- 18** Why do you think this may be happening?

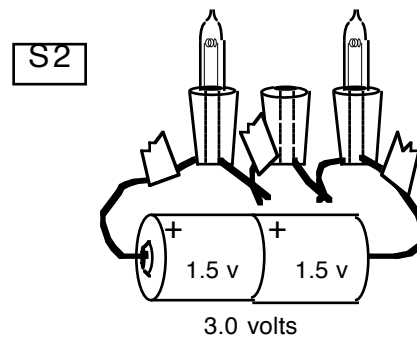
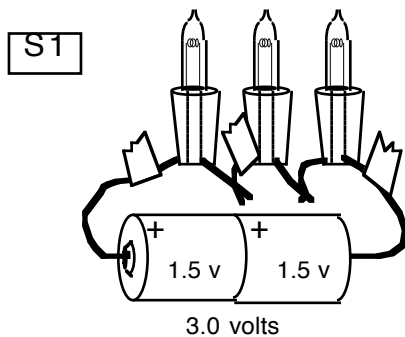
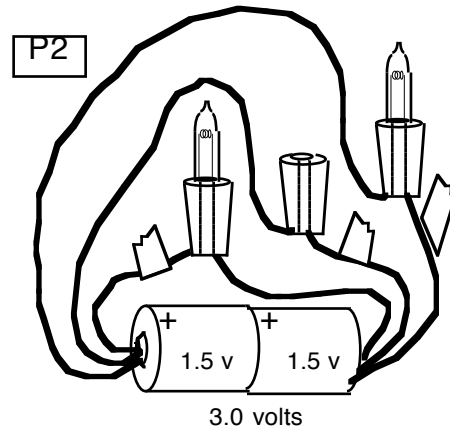
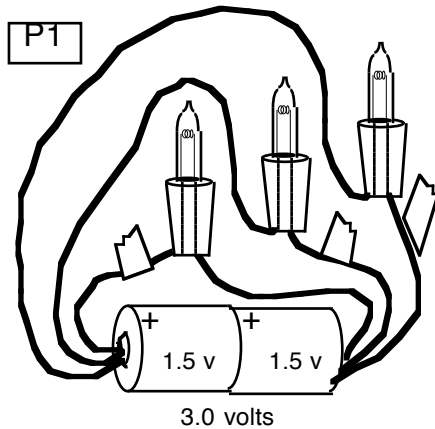
- 19.** What is the effect of running two simultaneous sets of wires, Circuit [C], between the batteries and the light bulbs?

- 20.** Why do you think this may be happening?

Parallel & Series Circuit Notes/Activities

Answer questions in complete sentences, when possible.

Read the questions below and make the following circuits.



21. Circle the light bulbs that light up on the pictures above.
22. Current flows through the wires. Current delivers the charges that carry the voltage to the electrical pieces. Describe why you got the results above on both sets of circuits in terms of current and voltage.

Parallel & Series Circuit Notes/Activities

Answer questions in complete sentences, when possible.

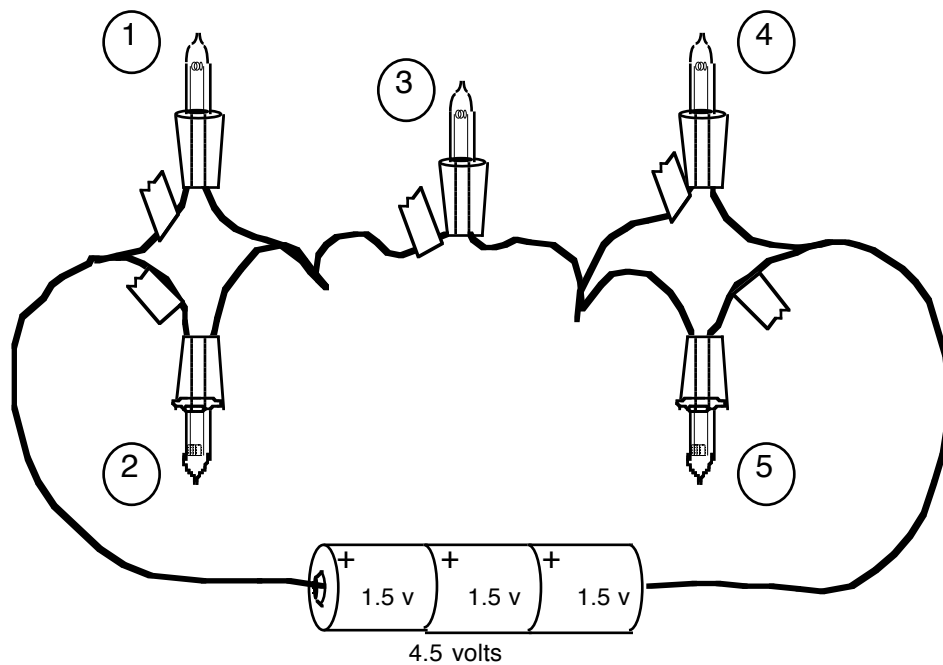
- 23.** How do you think the lights and outlets are wired in your home. Are they in series or parallel? Explain your answer.

Parallel & Series Circuit Notes/Activities

Answer questions in complete sentences, when possible.

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24. Draw a circuit for the picture below in the space under the picture.



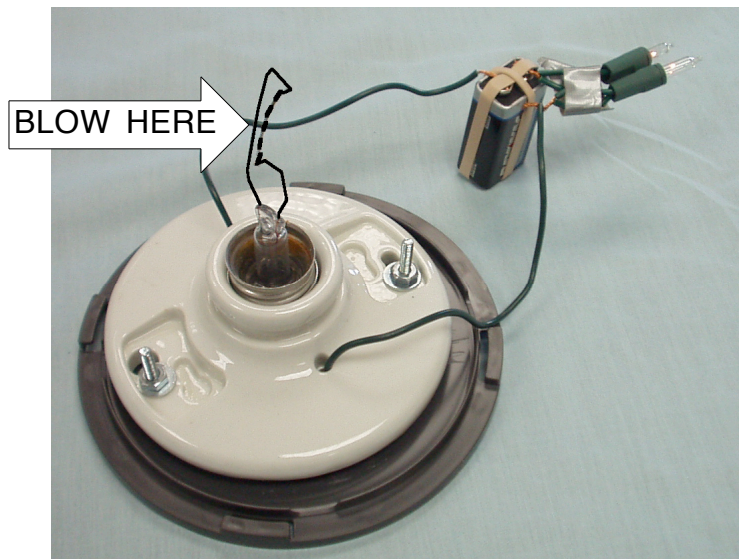
22. What do you think will happen and why when you replace the #3 light bulb with a dimmer light bulb?

Replace light bulb #3 with a dim bulb.

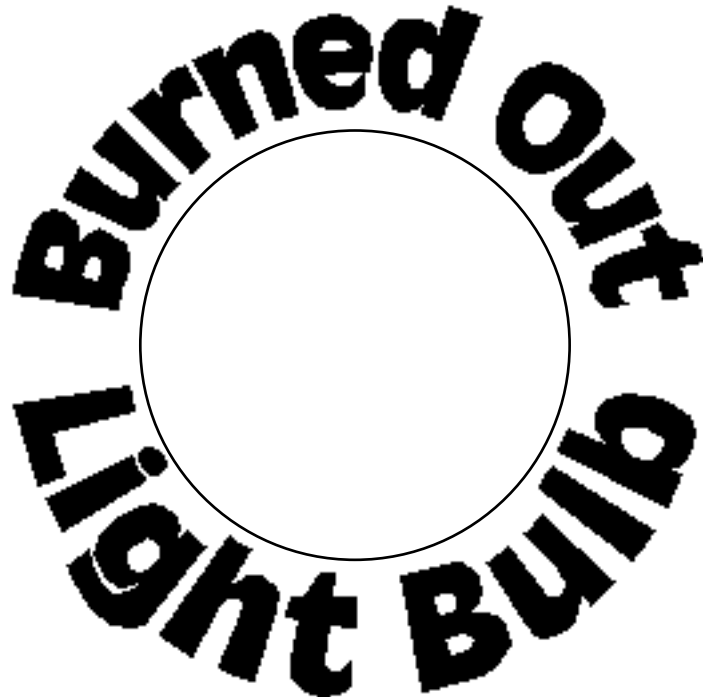
25. Was your prediction correct? If not what was different and explain why you got the results you got.

- 25** Hold your arm about 8 inches from your mouth. Blow on your arm. What do you feel happening to the temperature of your arm when you blow on it?

- 26** Look for the setup shown below in the room. The thin wire in the center of the fixture is a light bulb filament. (IT IS VERY FRAGILE. Do NOT touch it. It WILL break if you touch it.) GENTLY blow on the thin wire in the center of the fixture. While blowing, observe what happens to the light bulbs' brightness.



- 26** Based on your observations, explain what you think happens to a wire's resistance as it is cooled.



Look at the burned out light bulb in the class. In the circle above, draw what you see. Using your drawing as evidence explain why a burned out light bulb stops working.